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(54) **WEFT WITHDRAWING DEVICE OF AIR JET LOOM**

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See application file for complete search history.

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(57) **ABSTRACT**

A weft withdrawing device of an air jet loom includes a blow nozzle blowing a weft that is ejected from a weft insertion main nozzle and determined to be a weft insertion failure to guide the weft to a weft withdrawing passage, a weft introducing duct that is integrally swingable with a sley forward and backward, a weft withdrawing mechanism withdrawing the weft guided to the weft introducing duct, and a weft sensor optically detecting the weft. The weft withdrawing device of the air jet loom includes a weft guide member. The weft guide member includes a cloth fell side top portion and a let-off side top portion. The cloth fell side top portion is located above the weft withdrawing passage.

3 Claims, 7 Drawing Sheets

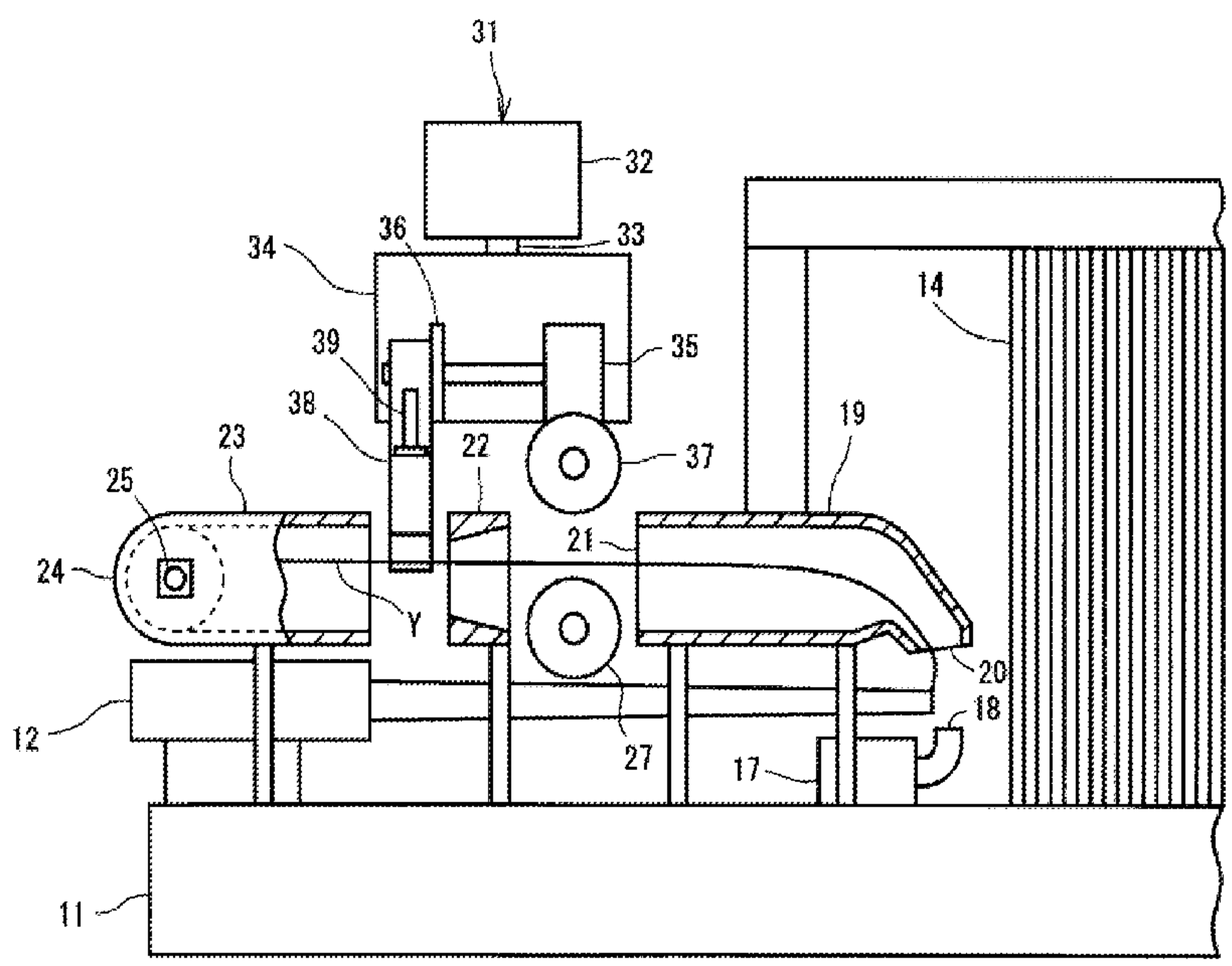

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FIG. 1

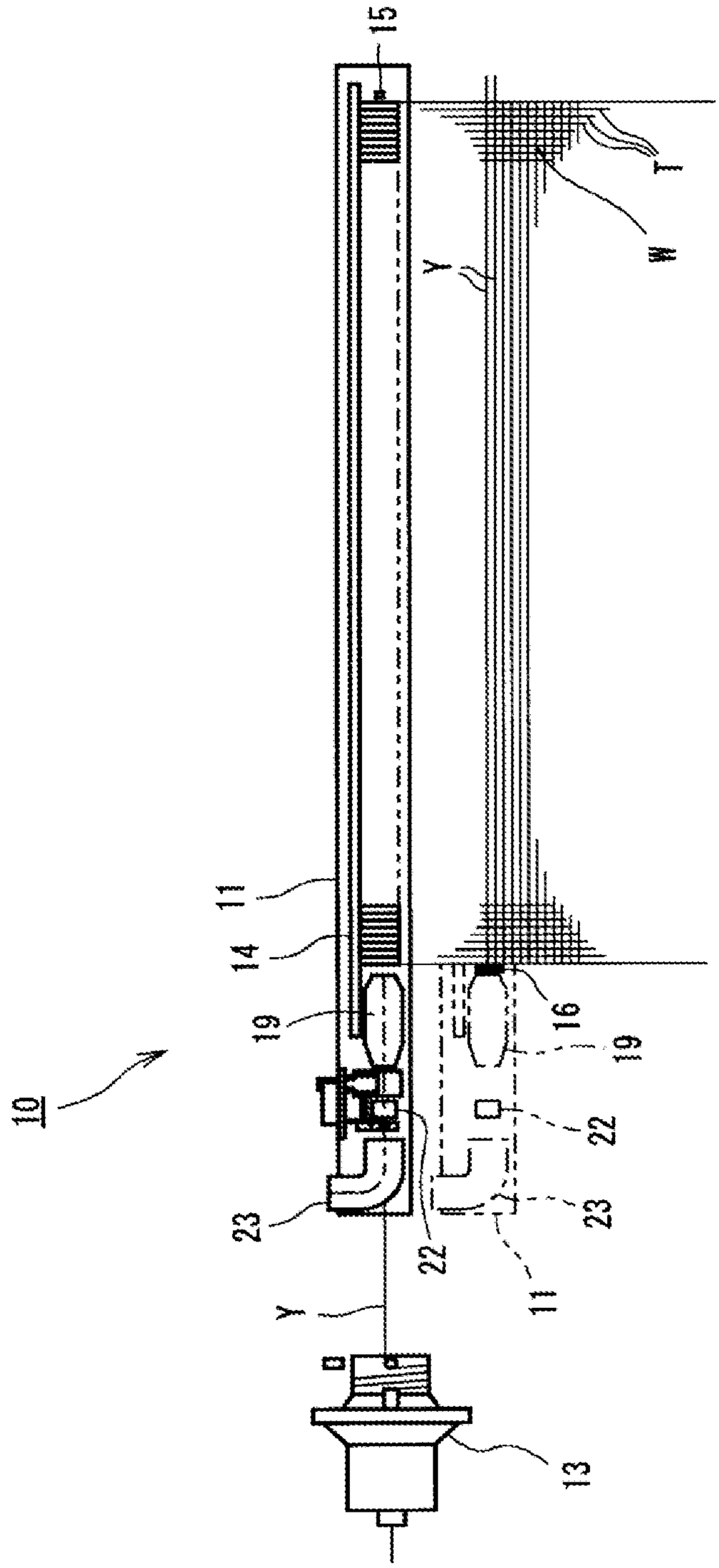


FIG. 2

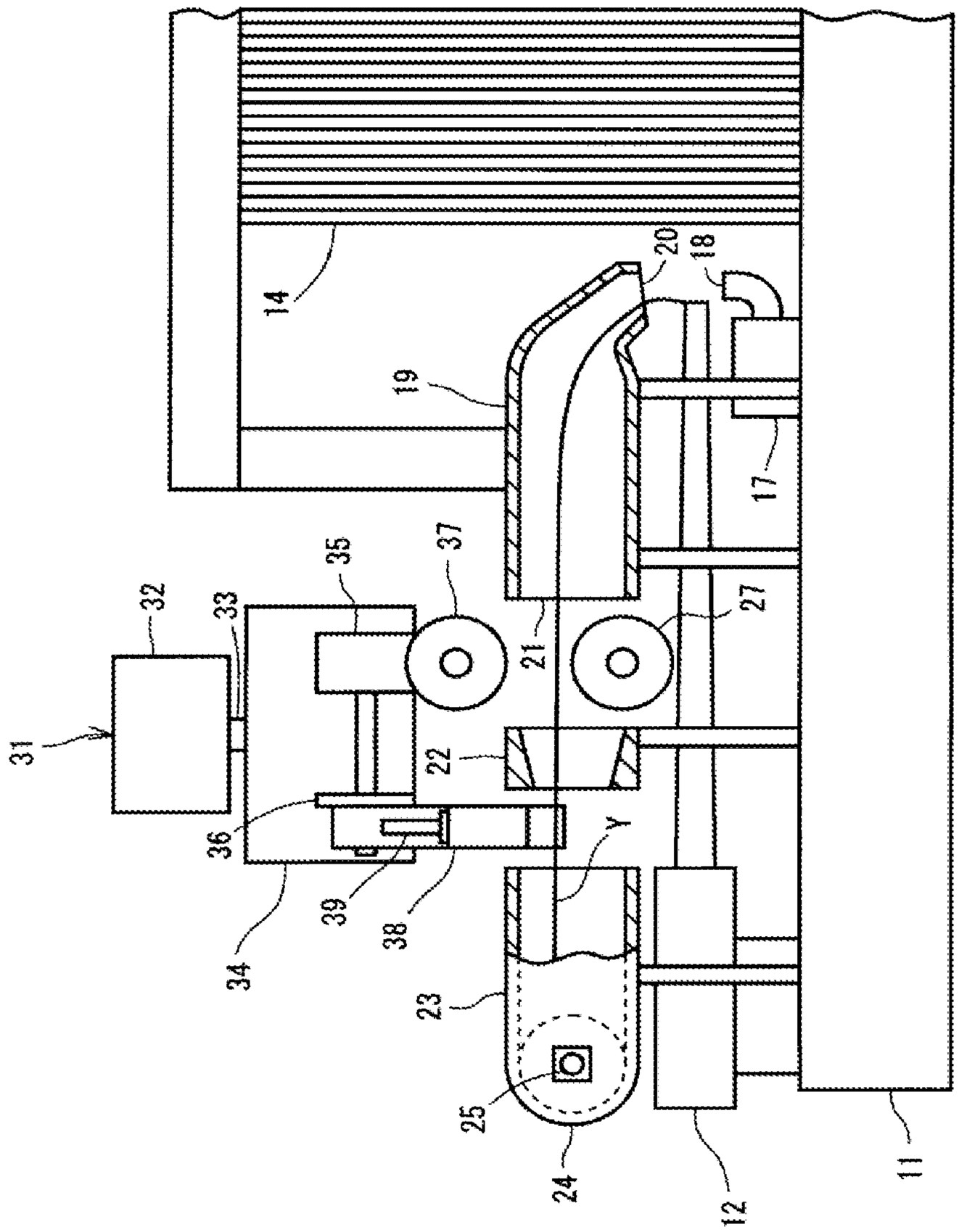


FIG. 3

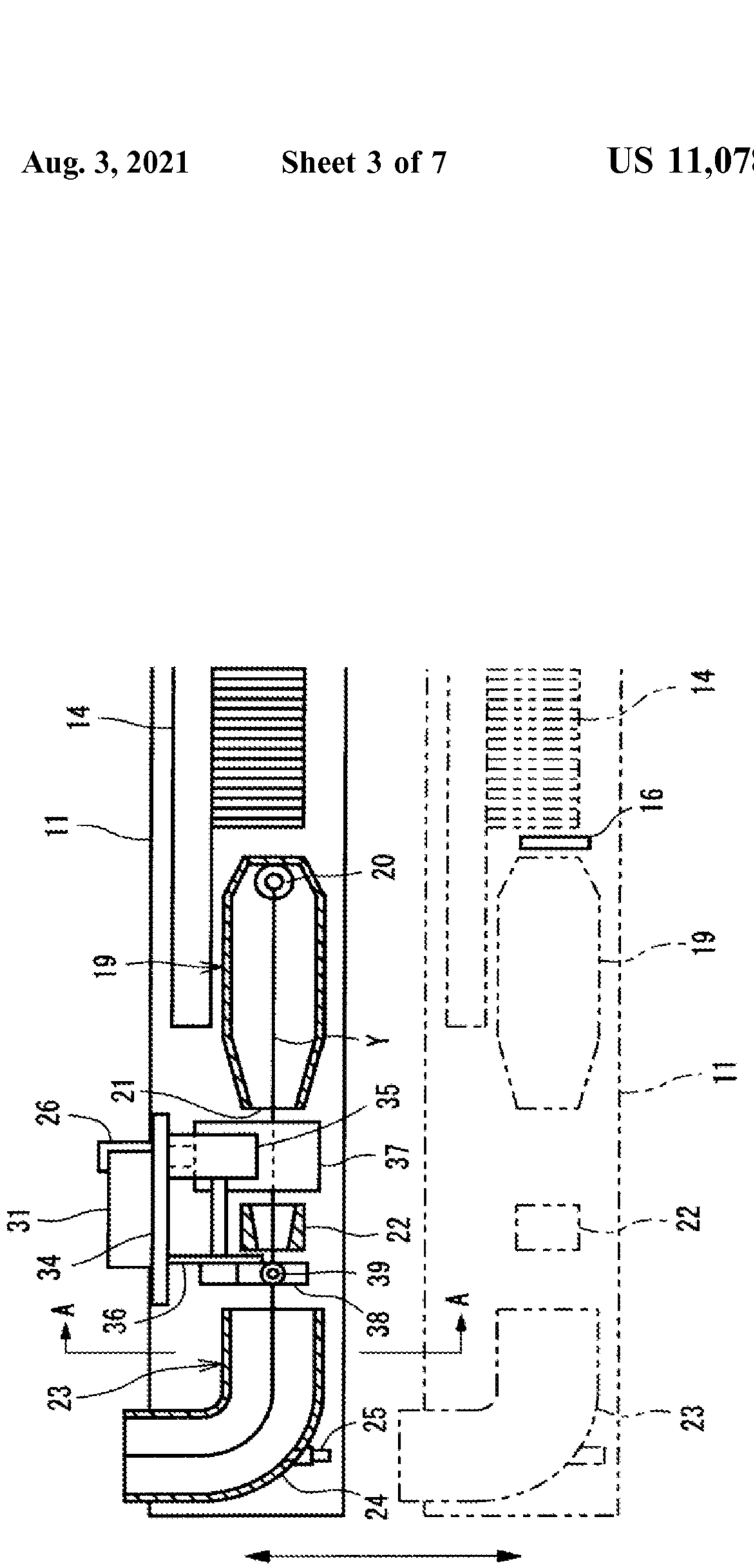


FIG. 4

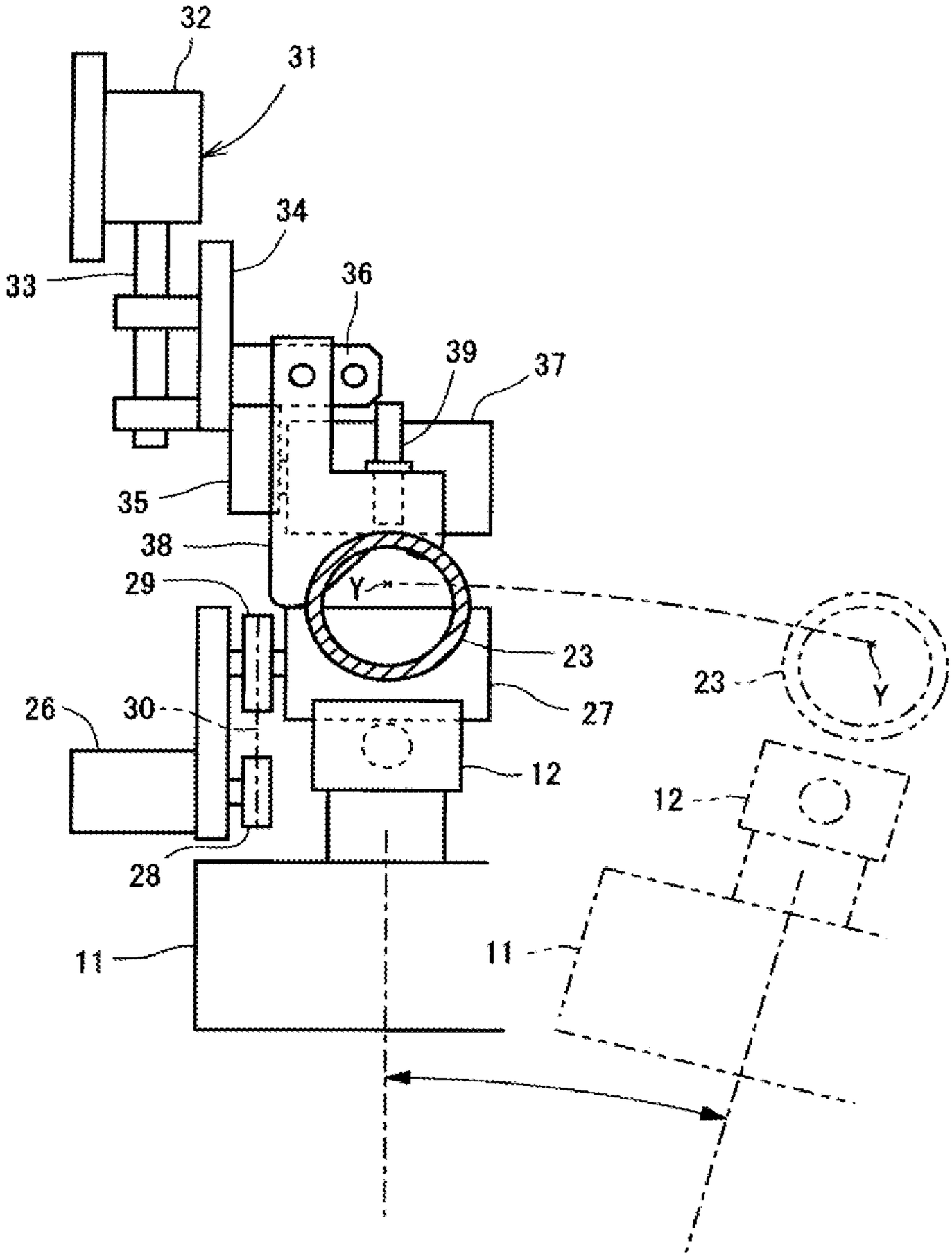


FIG. 5A

FIG. 5B

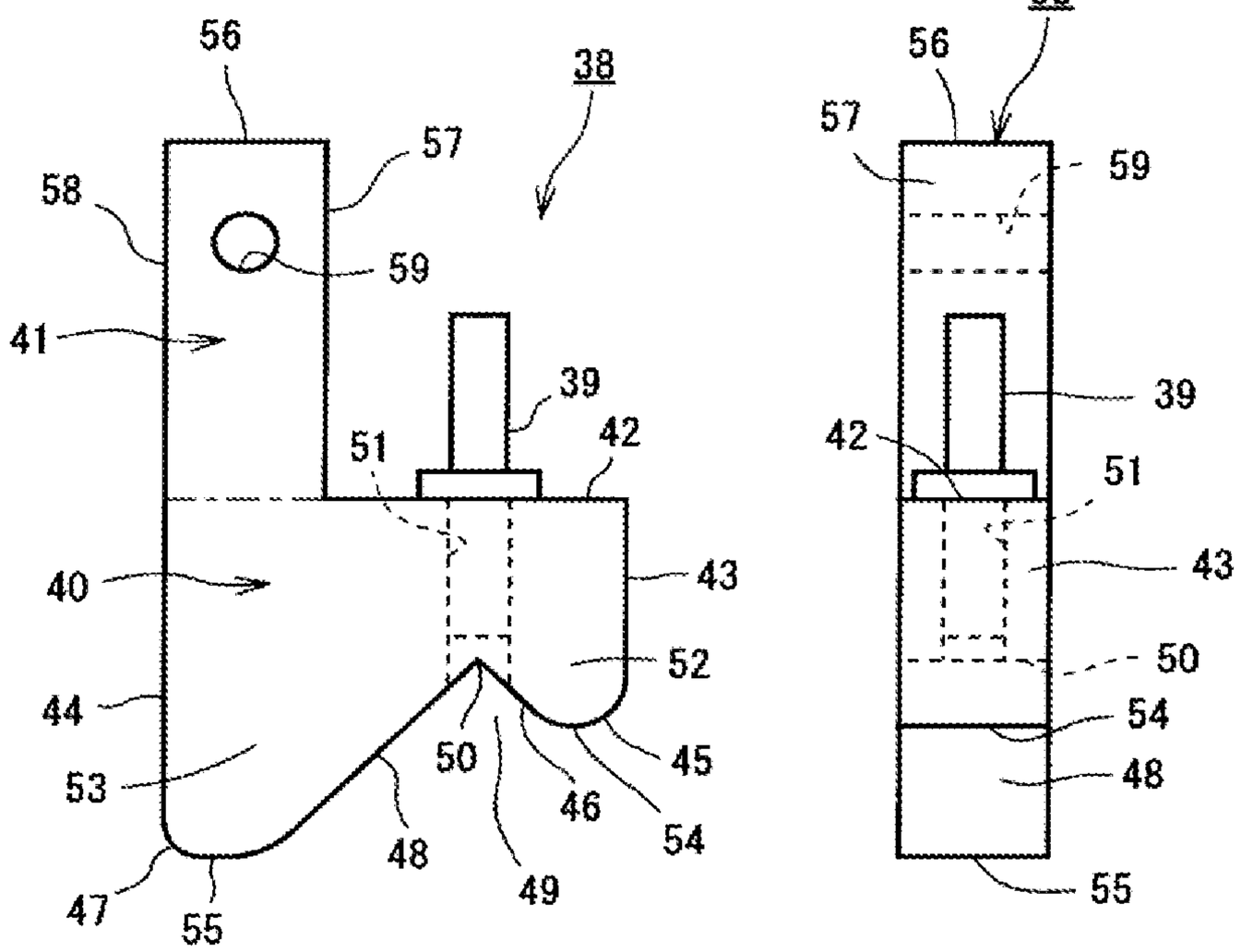


FIG. 5C

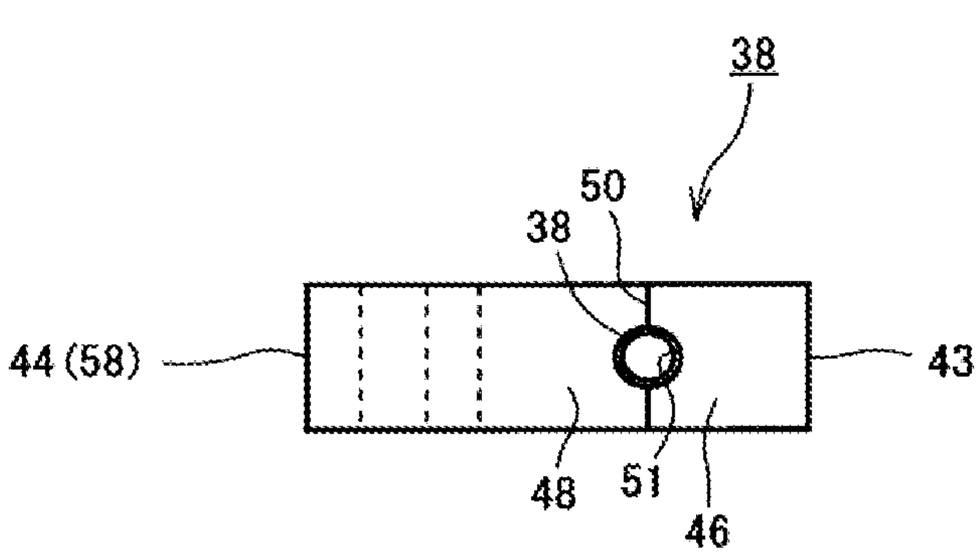


FIG. 6A

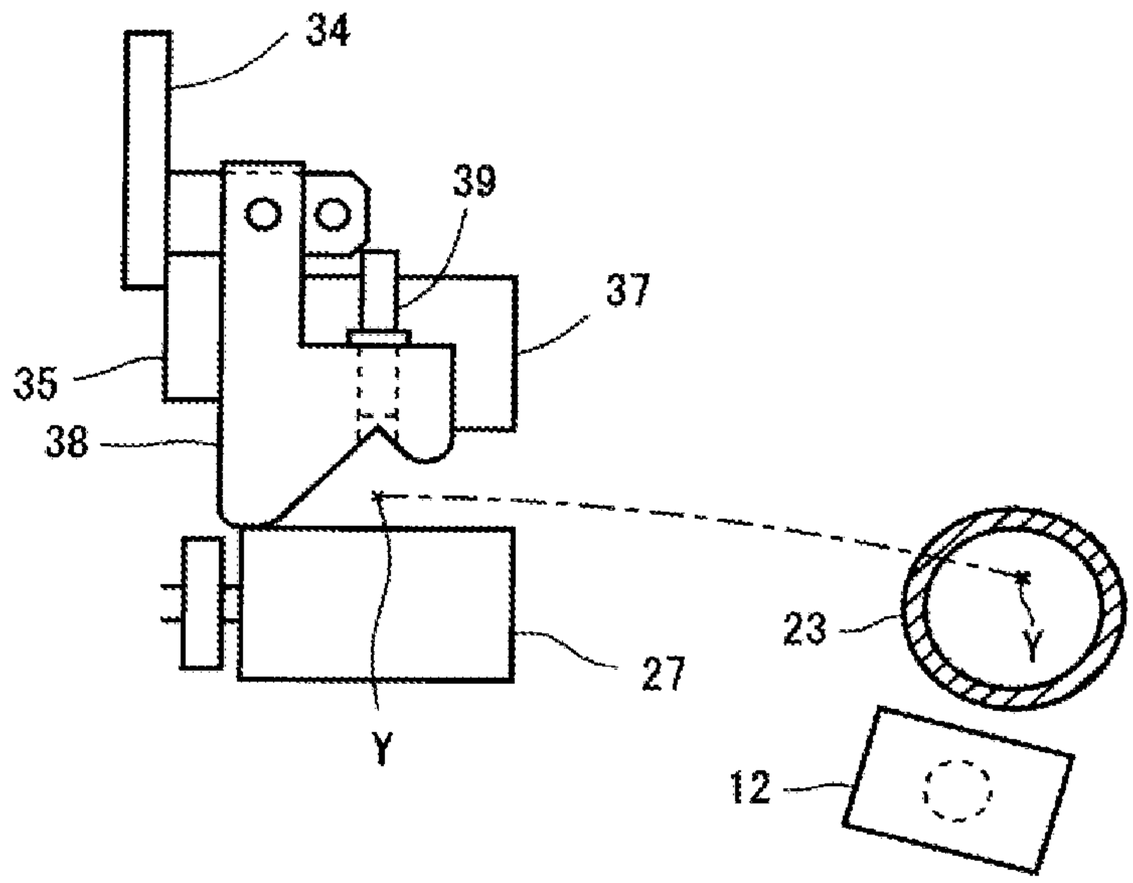


FIG. 6B

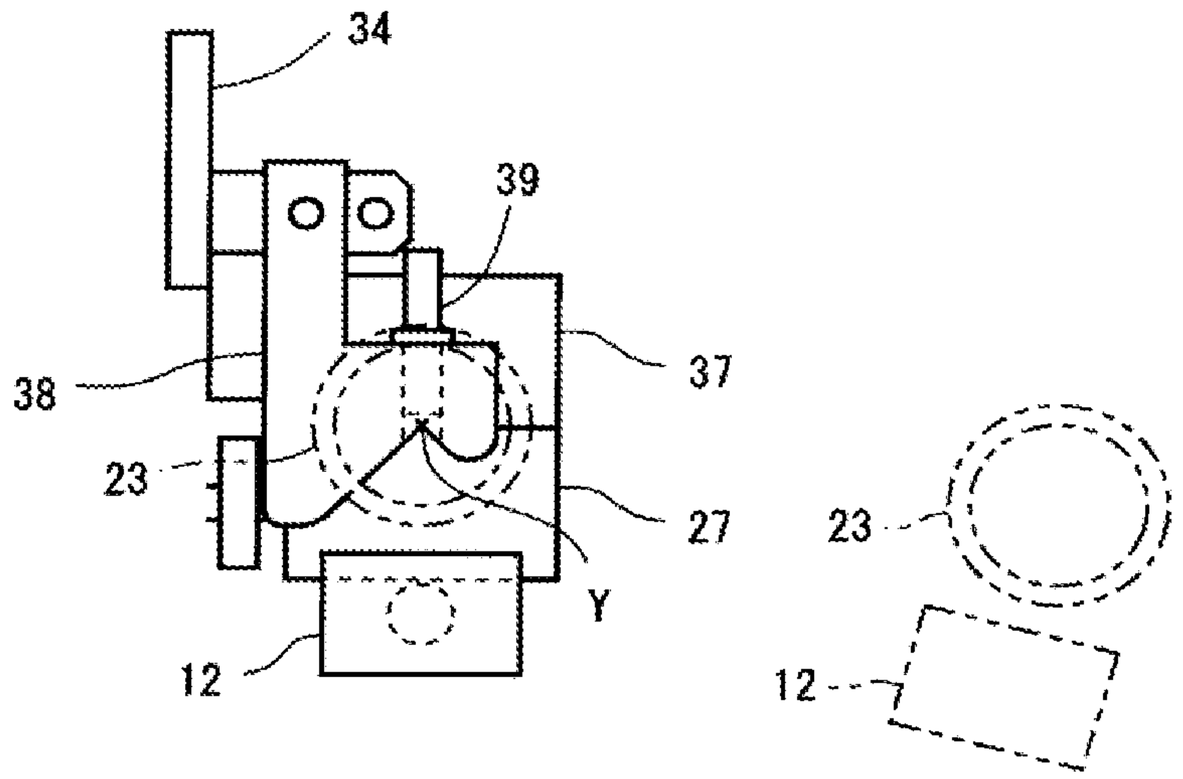
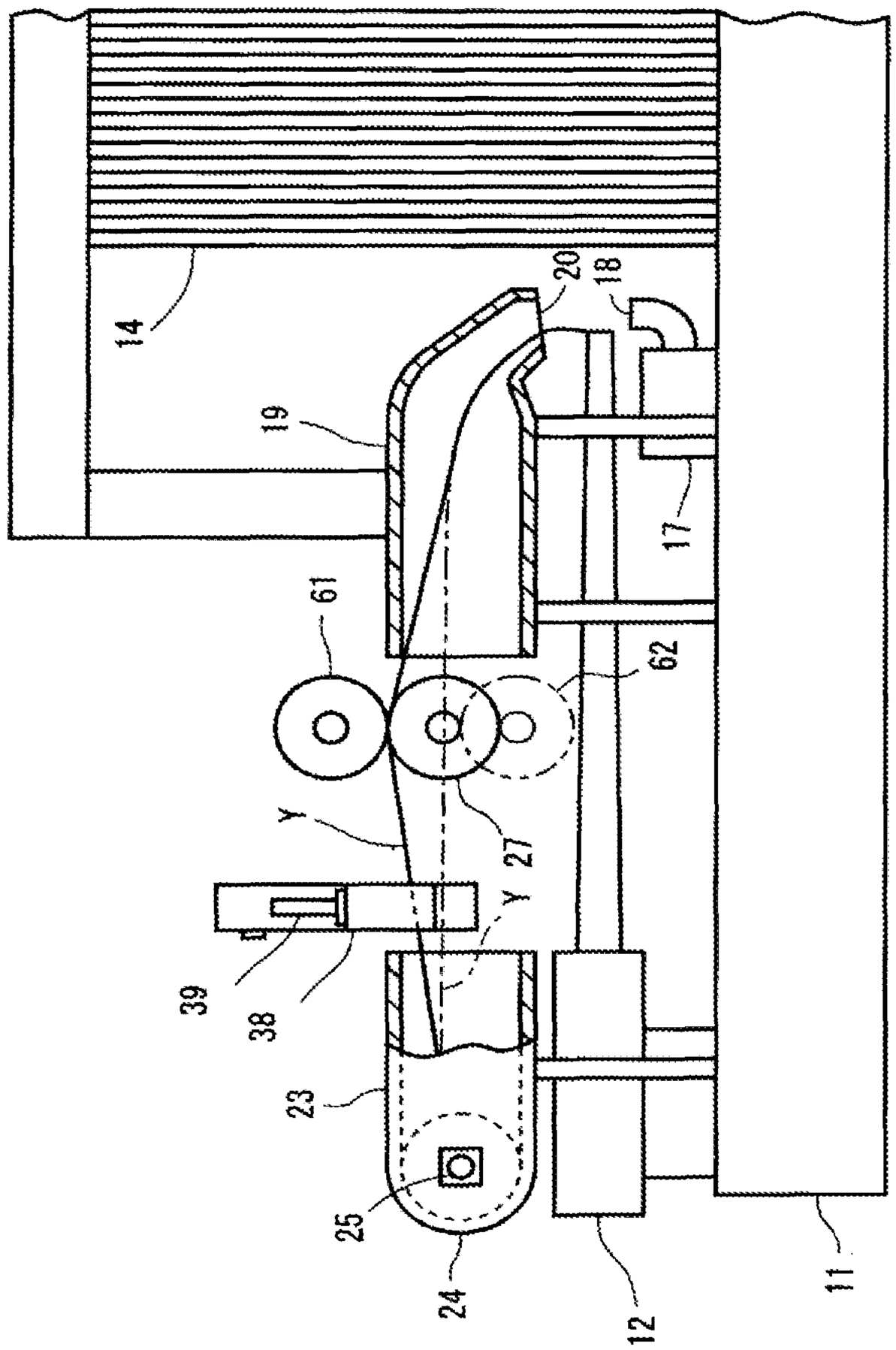


FIG. 7



WEFT WITHDRAWING DEVICE OF AIR JET LOOM

CROSS REFERENCE TO RELATED APPLICATION

This application claims priority to Japanese Patent Application No. 2019-003965 filed on Jan. 14, 2019, the entire disclosure of which is incorporated herein by reference.

BACKGROUND ART

The present disclosure relates to a weft withdrawing device of an air jet loom.

There has been known a device for withdrawing a failure weft of an air jet loom disclosed in Japanese Patent Application Publication No. S64-85351 as a conventional technique of a weft withdrawing device of an air jet loom. This type of the weft withdrawing device guides a weft that has failed in weft insertion to a weft introducing duct disposed adjacently to a weft insertion passage, withdraws the weft guided to the weft introducing duct by press-contact between a pair of rollers, and brings the withdrawn weft into contact with a turning detection arm to detect the weft.

In addition, there has been known a device for removing a failure weft of a fluid jet loom disclosed in Japanese Patent Application Publication No. 2001-11753 as another conventional technique. This type of the weft removing device includes a yarn winder that captures and takes up a failure yarn and a detector for detecting the failure yarn. When a weft insertion failure occurs, a weft from a main nozzle for weft insertion is kept continuous with the failure yarn by avoiding a cut of the failure yarn with a yarn feeding cutter, that is, the weft is uncut, and then, the yarn winder is moved to a capture position near the main nozzle to capture the failure yarn. After that, the yarn winder is moved to a take-up position. The failure yarn is cut off from the weft from the main nozzle and withdrawn from a cloth by the yarn winder. The detector for detecting the failure yarn is attached to an arm portion of a moving bracket. A casing of the detector includes a pair of guide walls that extends toward each end of the guide walls and a detection wall located in a convergence direction of the pair of guide walls. The detector has a detection area in the vicinity of the detection wall. The pair of guide walls is formed so that the guide walls open in a moving direction of the guide walls when the yarn winder is moved to the take-up position.

However, fiber dust is easily attached to the turning detection arm of the weft withdrawing device disclosed in the Publication No. S64-85351, requiring a removing work to remove the attached fiber dust frequently. To solve this, it is considered that the weft detector in the Publication No. 2001-11753 is applied to the weft withdrawing device in the Publication No. S64-85351. In the weft withdrawing device in the Publication No. S64-85351, the weft introduced to the weft introducing duct moves to a rear weft withdrawing position from the front with the weft introducing duct in accordance with swing of a reed. Accordingly, a moving path of the weft introduced to the weft introducing duct in accordance with the swing of the reed is determined by movement of the weft introducing duct. On the other hand, the weft detector of the Publication No. 2001-11753 includes the pair of guide walls that extends toward each end of the guide walls and the detection wall located in the convergence direction of the pair of guide walls. The weft detector has the detection area in the vicinity of the detection wall. Therefore, in a case where the weft detector having the pair of guide walls in the Publication No. 2001-11753 is simply applied so as to guide a weft to the detection region of the weft detector in the Publication No. 2001-11753, there is a problem that the weft detector interferes with the weft, preventing the movement of the weft to the weft withdrawing position.

The present disclosure has been made in view of the above circumstances and is directed to a weft withdrawing device of an air jet loom surely detecting a weft that has failed in weft insertion without preventing movement of the weft by a weft detector and removing fiber dust attached to the weft detector.

SUMMARY

In accordance with an aspect of the present disclosure, there is provided a weft withdrawing device of an air jet loom that includes a blow nozzle blowing a weft that is ejected from a weft insertion main nozzle and determined to be a weft insertion failure to guide the weft to a weft withdrawing passage adjacent to a weft insertion passage, a weft introducing duct that is integrally swingable with a sley forward and backward and to which the weft blown and guided to the weft withdrawing passage is introduced, a weft withdrawing mechanism provided on the weft withdrawing passage, and withdrawing the weft guided to the weft introducing duct by a pair of rollers, and a weft sensor optically detecting the weft that is withdrawn through the weft withdrawing passage. The weft withdrawing device of the air jet loom includes a weft guide member having a guide recess to which the weft is introduced and supporting the weft sensor at a position where the weft sensor detects the weft introduced to the guide recess. The weft guide member includes a cloth fell side top portion having a top portion near a cloth fell and forming the guide recess and a let-off side top portion having a top portion near the warps to be let-off and forming the guide recess. The cloth fell side top portion is located above the weft withdrawing passage in a state before the pair of the rollers is brought into press-contact with the weft.

Other aspects and advantages of the disclosure will become apparent from the following description, taken in conjunction with the accompanying drawings, illustrating by way of example the principles of the disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

The disclosure, together with objects and advantages thereof, may best be understood by reference to the following description of the embodiments together with the accompanying drawings in which:

FIG. **1** is a plan view schematically showing a weft withdrawing device of an air jet loom according to a first embodiment of the present disclosure;

FIG. **2** is a front view showing a main section of the weft withdrawing device of the air jet loom according to the first embodiment;

FIG. **3** is a plan view showing the main section of the weft withdrawing device of the air jet loom according to the first embodiment;

FIG. **4** is a view as viewed in the direction of arrows A, A of FIG. **3**;

FIG. **5**A is a side view of a weft guide member of FIG. **4**;

FIG. **5**B is a rear view of the weft guide member of FIG. **4**;

FIG. **5**C is a bottom view of the weft guide member of FIG. **4**;

FIG. **6**A is a side view showing the main section of the weft withdrawing device of the air jet loom of FIG. **1** in a state before the weft guide member is lowered;

FIG. **6**B is a side view showing the main section of the weft withdrawing device of the air jet loom of FIG. **1** in a state after the weft guide member has been lowered; and

FIG. **7** is a front view showing a main section of a weft withdrawing device of an air jet loom according to a second embodiment of the present disclosure.

DETAILED DESCRIPTION OF THE EMBODIMENTS

First Embodiment

The following will describe a weft withdrawing device of an air jet loom according to a first embodiment of the present disclosure with reference to the accompanying drawings. Referring to FIG. **1** and FIG. **2**, an air jet loom **10** includes a sley **11** and a weft insertion main nozzle **12** attached to a first end side of the sley **11**. The air jet loom **10** also includes a weft measuring and storing device **13** near the weft insertion main nozzle **12**. The weft measuring and storing device **13** measures a length of a weft Y and stores the weft Y by winding the weft Y. The weft Y stored in the weft measuring and storing device **13** is supplied to the weft insertion main nozzle **12** in synchronization with timing of weft insertion.

A profiled reed **14** is provided upright on the sley **11** and has a weft insertion passage (not shown). The weft insertion passage of the profiled reed **14** is a passage through which the weft Y ejected from the weft insertion main nozzle **12** is propelled in synchronization with timing of weft insertion. The sley **11** includes a plurality of auxiliary nozzles for weft insertion (not shown). Compressed air is jetted from these auxiliary nozzles for weft insertion to help propel the weft Y ejected from the weft insertion main nozzle **12**.

The weft insertion main nozzle **12** ejects the weft Y stored in the weft measuring and storing device **13** to the weft insertion passage of the profiled reed **14** in synchronization with the timing of weft insertion. A weft feeler **15** is disposed in a second end side of the sley **11**. The weft feeler **15** detects whether or not a weft insertion failure occurs. When the weft insertion is normally performed, an end of the weft Y passes through a shed formed by warps T and arrives at a position at which the weft feeler **15** is disposed. The weft feeler **15** is connected to a control device (not shown) that determines a weft insertion failure when the weft feeler **15** detects the weft insertion failure. The profiled reed **14** performs beating up motion when the weft insertion has been normally performed.

A weft cutter **16** cutting the weft Y is provided near an end of a woven cloth W which is close to the weft insertion main nozzle **12**. The weft cutter **16** cuts the weft Y every beating up by the profiled reed **14** when weft insertion is normally performed, separating the weft Y away from the weft insertion main nozzle **12**. On the other hand, when a weft insertion failure has occurred, the weft cutter **16** does not cut the weft Y, not separating the weft Y away from the weft insertion main nozzle **12**.

Referring to FIG. **2**, a blow nozzle **17** is disposed on the sley **11** in such a manner that the blow nozzle **17** is located directly below the weft insertion main nozzle **12**. The blow nozzle **17** blows the weft Y that is ejected from the weft insertion main nozzle **12** and determined to be a weft insertion failure to guide the weft Y to a weft withdrawing passage adjacent to the weft insertion passage. Compressed air is jetted from a nozzle hole **18** of the blow nozzle **17** in a direction in which the compressed airflow intersects with a direction of weft insertion at a front side of the weft insertion main nozzle **12**. The weft insertion passage herein refers to the passage through which the weft Y is propelled.

A weft introducing duct **19** is disposed above the blow nozzle **17**. The weft introducing duct **19** is a duct to which the weft Y blown and guided to the weft withdrawing passage adjacent to the weft insertion passage by the blow nozzle **17** is introduced. An inlet **20** of the weft introducing duct **19** faces the nozzle hole **18** of the blow nozzle **17**. An air guide **22** is disposed so as to face an outlet **21** of the weft introducing duct **19**. Furthermore, a suction duct **23** is disposed so as to face an outlet of the air guide **22**. The air guide **22** helps the weft Y introduced to the weft introducing duct **19** to be guided to the suction duct **23**. A blade body cutting the weft Y that has failed in weft insertion (hereinafter, called failure weft Y) (not shown) is disposed between the inlet **20** of the weft introducing duct **19** and a nozzle end of the weft insertion main nozzle **12**.

Referring to FIG. **3**, the suction duct **23** is curved so that an outlet of the suction duct **23** is oriented to a dust box (not shown). The dust box is disposed at a rear side of a sley swinging area where the sley **11** is swingable. In this embodiment, a front side is defined as a side where there is a cloth fell and a rear side is defined as a side from which the warps T are let off. An air nozzle **25** that is connected to the air supply source is connected to a curved portion **24** of the suction duct **23**. The air nozzle **25** faces the outlet of the suction duct **23**. The weft introducing duct **19**, the air guide **22**, and the suction duct **23** cooperate to form the weft withdrawing passage through which the weft Y is withdrawn and the weft withdrawing passage is integrally swingable with the sley **11** forward and backward.

Referring to FIG. **4**, a stepping motor **26** is disposed in a machine at the rear side of the sley swinging area. A drive roller **27** is rotatably supported above the stepping motor **26**. A drive pulley **28** of the stepping motor **26** and a driven pulley **29** near the drive roller **27** are connected by a timing belt **30**. An air cylinder **31** is disposed above the stepping motor **26** in a higher position than a position of the drive roller **27**. The air cylinder **31** includes an air cylinder body **32** attached so as to be oriented to the machine and a rod **33** extending to or retracting from the air cylinder body **32**. A direction in which the rod **33** extends to or retracts from is an upper and lower direction.

The rod **33** of the air cylinder **31** is attached to a rear surface of a plate member **34** that is positioned upright. With this configuration, the plate member **34** is raised and lowered by an operation of the air cylinder **31**. The plate member **34** includes on a front surface thereof a first bracket **35** and a second bracket **36** protruding toward a front side of the air jet loom **10**.

A driven roller **37** is rotatably supported by the first bracket **35**. The driven roller **37** faces the drive roller **27** that is located below the driven roller **37**. Lowering the rod **33** of the air cylinder **31** brings the driven roller **37** into contact with the drive roller **27**, pressing the drive roller **27**. When the sley **11** moves to the rear side of the machine in the sley swinging area, the drive roller **27** and the driven roller **37** are located between the weft introducing duct **19** and the air guide **22** on the weft withdrawing passage. The drive roller **27** and the driven roller **37** correspond to a pair of rollers provided in the weft withdrawing mechanism in the present disclosure. Accordingly, the weft withdrawing mechanism in the first embodiment has the stepping motor **26**, the drive roller **27**, and the driven roller **37**, and is provided on the

weft withdrawing passage. The weft withdrawing mechanism withdraws the weft Y guided to the weft introducing duct **19** by the drive roller **27** and the driven roller **37**. The stepping motor **26** is controlled on the basis of an order of the control device.

A weft guide member **38** is attached to the second bracket **36**. Thus, the weft guide member **38** is movable to the weft Y when the weft Y is withdrawn by the drive roller **27** and the driven roller **37**. The weft guide member **38** supports a weft sensor **39** optically detecting the weft Y that is withdrawn through the weft withdrawing passage. The weft guide member **38** guides the weft Y through the weft withdrawing passage to a detectable range of the weft sensor **39**. The weft sensor **39** is a reflective optical sensor, and has a light projecting portion (not shown) that emits sensor light to the weft Y and a light receiving portion (not shown) that receives reflected light from the weft Y. The weft sensor **39** is electrically connected to the control device. When the weft sensor **39** detects the weft Y, the weft sensor **39** sends a detection signal to the control device.

The following will describe a shape of the weft guide member **38**, especially each portion of the weft guide member **38** using the upper and lower direction and the front and rear direction of the weft guide member **38** attached to the second bracket **36** as a reference. Referring to FIG. **5**A, the weft guide member **38** has a guide body portion **40** and an arm portion **41** integrally formed with the guide body portion **40**.

The guide body portion **40** includes an upper end face **42**, a first side face **43**, a second side face **44**, a first arcuate face **45**, a first sloped face **46**, a second arcuate face **47**, and a second sloped face **48**. The upper end face **42** is oriented upward and the arm portion **41** is located at a rear side of the upper end face **42**. The first side face **43** extends downward from a front end of the upper end face **42**, and faces forward. The second side face **44** faces rearward at the opposite side of the weft guide member **38** relative to the first side face **43**.

The first arcuate face **45** extends continuously from a lower end of the first side face **43**, and the first sloped face **46** extends continuously from the first arcuate face **45**. The first sloped face **46** is a sloped face extending rearward and upward as the first sloped face **46** is distanced far from the first arcuate face **45**. The second arcuate face **47** continuously extends from a lower end of the second side face **44**, and the second sloped face **48** continuously extends from the second arcuate face **47**. The second sloped face **48** is a sloped face extending forward and upward as the second sloped face **48** is distanced far from the second arcuate face **47**. Upper ends of the first sloped face **46** and the second sloped face **48** are connected with each other. Thus, the guide body portion **40** has a guide recess **49** formed by the first arcuate face **45**, the first sloped face **46**, and the second sloped face **48**. A deepest portion **50** of the guide recess **49** has a through hole **51** passing from the guide recess **49** to the upper end face **42**. The weft sensor **39** is inserted through the through hole **51**. The weft guide member **38** has the guide recess **49** to which the weft Y is introduced and supports the weft sensor **39** at a position where the weft sensor **39** detects the weft Y introduced to the guide recess **49**.

The first side face **43**, the first arcuate face **45**, and the first sloped face **46** cooperate to form a cloth fell side protruding portion **52** protruding downward in the guide body portion **40** near the cloth fell. The second side face **44**, the second arcuate face **47**, and the second sloped face **48** cooperate to form a let-off side protruding portion **53** protruding downward in the guide body portion **40** near the warps T to be let off. Thus, the cloth fell side protruding portion **52** and the let-off side protruding portion **53** are located in the front side and the rear side of the guide recess **49**, respectively.

The cloth fell side protruding portion **52** of the weft guide member **38** includes a cloth fell side top portion **54** having a top portion near the cloth fell and forming the guide recess **49**. The cloth fell side top portion **54** is located at the bottom of the cloth fell side protruding portion **52**. Referring to FIG. **6**A, the cloth fell side top portion **54** is located above the weft withdrawing passage in a state before the drive roller **27** and the driven roller **37** are brought into press-contact with the weft Y With this configuration, even if the weft Y introduced to the suction duct **23** from the weft introducing duct **19** moves from the cloth fell toward the warps T to be let off, by the swing of the sley **11**, the weft Y is not interfered with the weft guide member **38**. Referring to FIG. **6**B, the cloth fell side top portion **54** is located below the weft withdrawing passage in a state that the drive roller **27** and the driven roller **37** are brought into press-contact with the weft Y.

The let-off side protruding portion **53** of the weft guide member **38** includes a let-off side top portion **55** having a top portion near the warps T to be let-off and forming the guide recess **49**. The let-off side top portion **55** is located at the bottom of the let-off side protruding portion **53**. The let-off side top portion **55** is located at a lower position than a position of the cloth fell side top portion **54**. Thus, the let-off side top portion **55** is located below the weft withdrawing passage. This means that a distance from the deepest portion **50** of the guide recess **49** to the cloth fell side top portion **54** in the upper and lower direction is shorter than a distance from the deepest portion **50** of the guide recess **49** to the let-off side top portion **55** in the upper and lower direction. The let-off side top portion **55** is located below the weft withdrawing passage. This configuration helps the weft Y to be guided by the second sloped face **48**, so that the weft Y may easily approach the weft sensor **39**.

The arm portion **41** of the weft guide member **38** extends upward in a rear portion of the guide body portion **40**. The arm portion **41** includes an upper end face **56**, a front face **57**, and a rear face **58**. The front face **57** is connected to a front end of the upper end face **56** and a rear end of the upper end face **42** of the guide body portion **40**. The rear face **58** has the same surface as the second side face **44** of the guide body portion **40**. The arm portion **41** has a communicating hole **59** through which a bolt is inserted near an upper end of the arm portion **41**. The weft guide member **38** is fixed to the second bracket **36** by the bolt (not shown) inserted through the communicating hole **59**.

The following will describe an operation of the weft withdrawing device of the air jet loom **10** according to the first embodiment. In an operation state of the air jet loom **10**, weft insertion of the weft Y ejected from the weft insertion main nozzle **12** is normally performed, and the weft Y arrives at an end of the cloth W located at the opposite side of the weft insertion main nozzle **12**. The profiled reed **14** then beats up the weft Y, and the weft Y is woven in the cloth fell of the cloth W. The beaten up weft Y is cut off by the weft cutter **16** disposed near the weft insertion main nozzle **12**. After that, the weaving operation is continued by repetition of weft insertion.

When a weft insertion failure in which the weft Y does not arrive at the end of the cloth W located at the opposite side of the weft insertion main nozzle **12** occurs, the weft feeler **15** detects the weft insertion failure. An operation of the drive motor of a main axis (not shown) is stopped on the basis of a detection signal indicating the weft insertion failure from the weft feeler **15**. After the detection signal of

the weft insertion failure is sent, the main axis rotates substantially once by inertia and stops. This means that the detection signal of the weft insertion failure is sent while the sley **11** proceeds toward the cloth W from the rearmost position in the sley swinging area. The failure weft Y is beaten up against the cloth W, and then, the sley **11** further repeats reciprocating motion and stops just before a reed beating position shown by two-dot chain lines in FIG. **1** and FIG. **3**. The cutting motion of the weft cutter **16** is suspended in response to the weft insertion failure detection signal issued. The uncut weft Y of the weft insertion failure that has been woven in the cloth W remains extending from the weft insertion main nozzle **12**.

Subsequently, compressed air is supplied to the blow nozzle **17** and the air nozzle **25**. This generates airflow in a suction direction into an inlet of the suction duct **23** as well as airflow crossing the weft insertion passage between the blow nozzle **17** and the weft introducing duct **19**. The airflow is generated while the sley **11** moves from a position shown by actual lines and stops at a position shown by the two-dot chain lines in FIG. **3** in the state in which the weft cutter **16** does not cut the weft Y. Thus, the weft Y of the weft insertion failure is woven in the state that the weft Y extends from the weft insertion main nozzle **12**. The following weft Y of the weft Y of the weft insertion failure is withdrawn from the weft measuring and storing device **13** by the compressed air jetted from the blow nozzle **17** and forcibly introduced into the weft introducing duct **19**.

When the following weft Y of the failure weft Y has a predetermined length or more, and is smoothly introduced into the weft introducing duct **19**, the following weft Y passes from the outlet **21** through the air guide **22** and arrives at the suction duct **23**. The following weft Y is then blown to the dust box by an jetting operation of the blow nozzle **17**. Thus, appropriate tension is applied to the weft Y between the weft introducing duct **19** and the suction duct **23**, so that the weft Y is taut.

The main axis rotates reversely by a predetermined rotation amount after the main axis stops. The sley **11** moves to the rearmost position, moving the weft Y to the weft withdrawing passage. Referring to FIG. **6**A, the cloth fell side top portion **54** of the weft guide member **38** is located above the weft withdrawing passage, so that the weft Y is not interfered with the weft guide member **38** when the weft Y is moved to the weft withdrawing passage. The warps T form a shed by the reverse rotation of the main axis, releasing a state in which the failure weft Y has been woven.

At the same time when the states in which the weft Y of the weft insertion failure has been woven is released, the following weft Y between the weft introducing duct **19** and the air guide **22** is disposed between the drive roller **27** and the driven roller **37**, and the following weft Y between the air guide **22** and the suction duct **23** is disposed below the weft guide member **38** including the weft sensor **39**. Then, the rod **33** of the air cylinder **31** is lowered, lowering the plate member **34**. Lowering the plate member **34** brings the driven roller **37** into press-contact with the drive roller **27**, and the weft guide member **38** is lowered, as shown in FIG. **6**B.

Lowering the weft guide member **38** brings the weft Y into press-contact with the drive roller **27** and the driven roller **37**. In addition, lowering the weft guide member **38** moves the weft Y relative to the weft guide member **38**, locating the weft Y in the guide recess **49**. When the weft Y is located in the guide recess **49**, the first sloped face **46** and the second sloped face **48** of the weft guide member **38** guide the weft Y to the deepest portion **50** of the guide recess **49** with the weft Y in sliding contact with the first sloped face **46** and the second sloped face **48** of the weft guide member **38** in accordance with a position of the weft Y. When the weft Y is located in the guide recess **49**, the weft sensor **39** optically detects the weft Y. In a case where there is fiber dust in the first sloped face **46** and the second sloped face **48**, the fiber dust is twined and caught by the guided weft Y.

When the weft Y is detected by the weft sensor **39**, the stepping motor **26** is driven. While the drive roller **27** rotates by a predetermined rotation amount, the drive roller **27** and the driven roller **37** rotate in a state in which the weft Y is held by the drive roller **27** and the driven roller **37**. The weft Y is withdrawn toward the suction duct **23** by the rotating of the drive roller **27** and the driven roller **37**. When the weft Y is withdrawn, withdrawal tension is generated in the weft Y. The blade body cuts off the weft Y by the withdrawal tension, separating the weft Y away from the weft insertion main nozzle **12**. Thus, when the end of the weft Y of a weft insertion failure passes between drive roller **27** and the driven roller **37**, the weft sensor **39** does not detect the weft Y. Therefore, the weft Y of the weft insertion failure is discharged to the dust box. In a case where the weft Y twines and catches fiber dust attached to the weft guide member **38**, the weft Y is discharged to the dust box with the fiber dust.

When the weft sensor **39** does not detect the weft Y, the supply of compressed air to the blow nozzle **17** and the air nozzle **25** is stopped, and the rod **33** of the air cylinder **31** is raised, raising the plate member **34**. The driven roller **37** and the weft guide member **38** are raised and returns to an original position by raising the plate member **34**, and then, the weaving is resumed.

The weft withdrawing device of the air jet loom **10** of the first embodiment provides the following advantageous effects.

(1) The weft Y determined to be a weft insertion failure is introduced to the weft introducing duct **19** by the blowing of the blow nozzle **17**. The weft Y in the weft introducing duct **19** moves to the weft withdrawing passage with the weft introducing duct **19**, and is withdrawn by the drive roller **27** and the driven roller **37**. The weft sensor **39** optically detects the withdrawn weft Y. In the state before the drive roller **27** and the driven roller **37** are brought into press-contact with the weft Y, the cloth fell side top portion **54** of the weft guide member **38** is located above the weft withdrawing passage, so that the weft Y is not interfered with the weft guide member **38** when the weft Y is moved to the weft withdrawing passage. In addition, when the weft Y is withdrawn, the weft Y is guided to the guide recess **49**, so that the weft Y is surely detected, and fiber dust that is located in the guide recess **49** is removed by the weft Y. Thus, the weft sensor **39** surely detects the failure weft Y without preventing the movement of the weft Y and fiber dust attached to the weft sensor **39** is removed.

(2) The weft guide member **38** is attached to the plate member **34** via the second bracket **36**. The plate member **34** may be raised and lowered by an operation of the air cylinder **31**. The weft guide member **38** moves to the weft Y when the weft Y is withdrawn by the drive roller **27** and the driven roller **37**, easily introducing the weft Y to the guide recess **49**, so that the weft Y may be surely detected.

(3) The weft guide member **38** has the let-off side top portion **55** having a top portion near the warps T to be let off. The distance from the deepest portion **50** of the guide recess **49** to the cloth fell side top portion **54** is shorter than the distance from the deepest portion **50** of the guide recess **49** to the let-off side top portion **55**. With this configuration, the

weft Y moves to the weft withdrawing passage without interfering with the cloth fell side top portion **54**, and is easily introduced to the guide recess **49** by the let-off side top portion **55** of the weft guide member **38**.

Second Embodiment

The following will describe a weft withdrawing device of the air jet loom **10** according to a second embodiment. The second embodiment is different from the first embodiment in that the weft guide member is not raised and lowered but fixed. In the second embodiment, the same configuration as that of the first embodiment is denoted by the same numerals with reference to the description of the first embodiment.

Referring to FIG. **7**, the weft withdrawing device of the air jet loom **10** does not include the air guide **22** between the weft introducing duct **19** and the suction duct **23**. The weft withdrawing mechanism has a drive roller **61** and a driven roller **62** corresponding to a pair of rollers in the present disclosure. The drive roller **61** is disposed above the driven roller **62** and attached to a fixing bracket (not shown). The drive roller **61** in the second embodiment is not raised and lowered. The driven roller **62** that is disposed below the drive roller **61** is raised and lowered so as to extend to and retract from the drive roller **61**. The driven roller **62** is attached to a movable bracket (not shown) that is raised and lowered by an air cylinder (not shown). The weft guide member **38** is fixed to a fixing bracket so as not to be raised and lowered as well as the drive roller **61**. The height of the weft guide member **38** is set so that the cloth fell side top portion **54** of the weft guide member **38** is located above the weft withdrawing passage.

The failure weft Y is introduced to the weft introducing duct **19** and the suction duct **23** by compressed air of the blow nozzle **17** and the air nozzle **25**. In a state in which the driven roller **62** is not raised, the weft Y on the weft withdrawing passage is located below the drive roller **61** and the weft guide member **38**. When the driven roller **62** is raised, the driven roller **62** brings up the weft Y into contact with the drive roller **61**. The weft Y is brought into press-contact with the drive roller **61** and the driven roller **62**, and has an inverted V shape by bringing up the driven roller **62**. In the weft guide member **38**, the weft Y is located in the guide recess **49** by bringing up the weft Y, and then, the weft sensor **39** detects the weft Y of the guide recess **49**. When the weft Y is detected by the weft sensor **39**, the drive roller **61** is driven, so that the weft Y of the weft insertion failure is discharged to the dust box.

The second embodiment provides the same advantageous effects as those in (1) and (3) of the first embodiment. In addition, the weft Y of a weft insertion failure on the weft withdrawing passage may be detected even if the weft guide member **38** is fixed.

The above embodiments each describe an exemplary embodiment of the present disclosure. The present disclosure is not limited to the specific embodiments described above, and may appropriately be modified within the gist of the disclosure as described below.

In the above embodiments, the distance from the deepest portion of the guide recess to the cloth fell top portion is shorter than the distance from the deepest portion of the guide recess to the let-off side top portion. However, the present disclosure is not limited to this embodiment. For example, the distance from the deepest portion of the guide recess to the cloth fell top portion may be the same as that from the deepest portion of the guide recess to the let-off side top portion.

In the above embodiments, one roller of the pair of rollers is fixed and the other roller is a movable roller that may extend to and retract from the one roller. However, the present disclosure is not limited to these embodiments. For example, the both rollers may be movable rollers that may extend to and retract from each other.

In the above embodiments, the weft guide member repeats reciprocating motion in an upper and lower direction in liner motion. However, the present disclosure is not limited to these embodiments. The weft withdrawing device of the air jet loom includes a configuration in which, for example, the weft guide member may repeat reciprocating motion in the upper and lower direction in circular motion.

What is claimed is:

1. A weft withdrawing device of an air jet loom comprising:

a blow nozzle blowing a weft that is ejected from a weft insertion main nozzle and determined to be a weft insertion failure to guide the weft to a weft withdrawing passage adjacent to a weft insertion passage;

a weft introducing duct that is integrally swingable with a sley forward and backward and to which the weft blown and guided to the weft withdrawing passage is introduced;

a weft withdrawing mechanism provided on the weft withdrawing passage, and withdrawing the weft guided to the weft introducing duct by a pair of rollers; and

a weft sensor optically detecting the weft that is withdrawn through the weft withdrawing passage, wherein

the weft withdrawing device of the air jet loom includes a weft guide member having a guide recess to which the weft is introduced and supporting the weft sensor at a position where the weft sensor detects the weft introduced to the guide recess,

the weft guide member includes a cloth fell side top portion having a top portion near a cloth fell and forming the guide recess and a let-off side top portion having a top portion near the warps to be let-off and forming the guide recess, and

the cloth fell side top portion is located above the weft withdrawing passage in a state before the pair of the rollers is brought into press-contact with the weft.

2. The weft withdrawing device of the air jet loom according to claim **1**, wherein

the weft guide member is movable to the weft when the weft is withdrawn by the pair of the rollers.

3. The weft withdrawing device of the air jet loom according to claim **1**, wherein

a distance from a deepest portion of the guide recess to the cloth fell side top portion is shorter than a distance from the deepest portion of the guide recess to the let-off side top portion.

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